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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
WOZNIAK, JAMES S	

ART UNIT	PAPER NUMBER
2626	

DATE MAILED: 07/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/832,132	CHEN, JUIN-HWEY	
	Examiner	Art Unit	
	James S. Wozniak	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 May 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-47* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-19 and 29-47* is/are allowed.

6)☒ Claim(s) *20-26* is/are rejected.

7)☒ Claim(s) *27 and 28* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 April 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. In response to the office action from 2/3/2006, the applicant has submitted an amendment, filed 5/8/2006, amending claim 26, while arguing to traverse the art rejection based on the limitations regarding deriving zero-input and zero-state response error vectors that are components of a quantization error vector and selecting an optimal codevector based upon a quantization error energy *(Amendment, Pages 21-29)*. In response to the applicant's arguments and for the reasons given below, claims 1-19 and 29-47 are allowable over the prior art of record. Also, the applicant's arguments directed towards claims 20-28 have been fully considered, but are not convincing for the below given reasons.

2. In response to the amendment of claim 26, the examiner has withdrawn the previous claim objection directed towards a lack of proper antecedent basis.

3. In response to the terminal disclaimer filed on 5/8/2006, the examiner has withdrawn the previous nonstatutory obviousness-type double patenting rejection.

Response to Arguments

4. Applicant's arguments have been fully considered but they are not persuasive for the following reasons:

With respect to **Claim 20**, the applicant argues that Iijima et al *(U.S. Patent: 5,828,996)* fails to teach derived prediction residuals related to an input speech training signal *(Amendment, Page 27)*. In response the examiner notes that Iijima recites processing input speech to generate residual signals *(Col. 2, Line 64- Col. 3, Line 14; and Col. 15, Lines 39-41)*, and further discloses that such input speech, which is used to select a optimal codevector *(Col. 23, Line 54- Col. 24, Line 23)*, may also be utilized in a codevector learning process. Thus, since the input speech can be used in a codevector learning procedure, it is also considered to be training speech.

The applicant further argues that Iijima fails to disclose the calculation of a quantization error or corresponding energy related to a residual, stating that Iijima instead discloses calculating a difference between perceptually weighted and synthesized speech *(Amendment, Page 28)*. In response, the examiner points out that Iijima discloses the calculation of a quantization error vector that is used to derive the quantization error energy *(Col. 15, Lines 5-51)*. Furthermore, Iijima recites that this quantization error energy, not an energy difference between perceptually weighted and synthesized speech, is utilized in a codebook search to determine an optimal codebook vector *(Col. 23, Line 59- Col. 24, Line 23)*.

Thus, since Iijima discloses: determining a residual for input speech that is used to train a learning codebook, determining a quantization error vector corresponding to the residual, determining a quantization error energy corresponding to the quantization error vector, and

selecting an optimal codevector in a codebook search based on the quantization error energy, as noted above, claim 20 remains rejected.

Claims 21-26 are argued as further limiting a rejected independent claim *(Amendment, Pages 28-29)*, and thus, also remain rejected.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. **Claims 20-23 and 25-26** are rejected under 35 U.S.C. 103(a) as being unpatentable over Iijima et al *(U.S. Patent: 5,828,996)* in view of Mermelstein et al *(U.S. Patent: 6,249,758)*.

With respect to **Claim 20**, Iijima discloses:

Deriving a sequence of residual signals corresponding to a sequence of input speech training signals *(deriving residuals, Col. 2, Line 64- Col. 3, Line 14; codebook training (learning), Col. 11, Line 46- Col. 12, Line 4)*;

Quantizing each of the residual signals into a corresponding preferred codevector selected from an initial set of N codevectors to minimize a quantization error associated with the preferred codevector, thereby producing a sequence of preferred codevectors corresponding to the sequence of residual signals *(selecting a series of vectors from a codebook that minimizes a quantization error, Col. 23, Line 59- Col. 24, Line 62)*;

Deriving total quantization error energy for one of the codevectors based on the quantization associated with each occurrence of the one of the codevectors in a sequence of preferred *(distance calculation used to determine quantization error energy, Col. 23, Line 59- Col. 24, Line 62)*;

Although Iijima teaches a means for selecting codevectors that minimize a quantization energy, Iijima does not specifically suggest using the selected codevectors to update a codebook, however Mermelstein teaches such a method for updating a codebook *(Col. 6, Lines 20-26)*.

Iijima and Mermelstein are analogous art because they are from a similar field of endeavor in speech coding. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Iijima with the codebook updating means taught by Mermelstein in order to implement a coding method capable of better predicting pitch characteristics of a speech signal through the use of an adaptive codebook *(Mermelstein, Col. 1, Line 66- Col. 2, Line 2)*.

With respect to **Claims 21-22**, Iijima further teaches processing performed on multiple vectors (Col. 5, Lines 10-20) and a learning process involving multiple vectors *(Col. 27, Lines 4-7)*.

With respect to **Claim 23**, Iijima further teaches an error threshold used in a codebook update *(Col. 26, Line 57- Col. 27, Line 7)*.

With respect to **Claim 25**, Iijima further teaches multi-dimensional vectors *(Col. 20, Lines 32-45)*.

With respect to **Claim 26**, Iijima recites:

Deriving a zero-input response error vector common to teach of the N VQ codevectors *(reference vector error, Col. 23, Line 59- Col. 24, Line 62)*;

Deriving N zero-state response error vectors common to teach of the N VQ codevectors *(zero-state distance calculation, Col. 23, Line 59- Col. 24, Line 62)*;

Separately combining the zero-input response error with each of the zero state response error vectors *(codebook search for a minimum quantization error energy utilizing a reference error vector and a zero-state distance calculation, Col. 23, Line 59- Col. 24, Line 62)*; and

Selecting one of the codevectors corresponding to a minimum one of the N quantization error energy values as the predefined codevector *(Col. 23, Line 59- Col. 24, Line 62)*.

7. **Claim 24** is rejected under 35 U.S.C. 103(a) as being unpatentable over Iijima et al *(U.S. Patent: 5,828,996)* in view of Mermelstein et al *(U.S. Patent: 6,249,758)*, and further in view of Gao et al (U.S. Patent: 6,104,992).

With respect to **Claim 24**, Iijima in view of Mermelstein teaches that method for updating a codebook with codevectors having minimized quantization error energy, as applied to Claim 20. Iijima in view of Mermelstein does not specifically suggest the use of a scalar vector, however Gao teaches the use of such a vector in an adaptive codebook *(Col. 9, Lines 65-67)*.

Iijima, Mermelstein, and Gao are analogous art because they are from a similar field of endeavor in speech coding. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Iijima in view of Mermelstein with the use of a scalar vector as taught by Gao in order to enable full rate encoding having a bit rate of 11.0 kbps *(Gao, Col. 4, Lines 28-37)*.

Allowable Subject Matter

8. **Claims 1-19 and 29-47** are allowable over the prior art of record.

9. The following is an examiner's statement of reasons for allowance:

With respect to **Claims 1 and 29**, the prior art of record fails to explicitly teach or fairly suggest, either singly or in combination, a method or system for searching for N preferred vector quantization (VQ) codevectors in a noise feedback coding (NFC) comprising: predicting a speech signal to derive a residual signal, deriving a zero-input response (ZIR) error vector common to each of the N VQ codevectors by setting an input speech vector to zero *(Specification, Paragraph 227)*, wherein the ZIR error vector is a component of a quantization error vector, deriving N zero-state response (ZSR) error vectors each based on a corresponding one of the N VQ codevectors by setting filter memories to zero *(Specification, Paragraphs 227 and 234)*, wherein each of the N ZSR error vectors is a further component of a quantization error vector, and selecting the preferred one of the N VQ codevectors corresponding to the residual signal based on the ZIR error vector and N ZSR error vectors.

Although Watts discloses the use of ZIR and ZSR to perform a codevector update based on minimizing an error quantity (Pages 276-277, Section 3), the presently claimed invention, as is correctly noted by the applicant (Amendment, Pages 22-23), recites that ZIR and ZSR error vectors are part of a *quantization error vector* (*the difference between a quantizer input and output)* used to select a preferred VQ codevector. Watts, on the other hand, discloses the use of ZIR and ZSR as part of a *reconstruction error (the difference between input and reconstructed*

speech). Thus, ZIR and ZSR in Watts are utilized in a different type error calculation than is recited in the presently claimed invention and Watts fails to explicitly teach or fairly suggest ZIR and ZSR error vectors that are components of a quantization error vector used for selecting a preferred VQ codevector.

As is further noted by the applicant, the presently claimed invention is directed towards noise feedback coding, which is defined as passing a difference signal between a quantizer input and output through a filter in a noise feedback path whose output is then added to a prediction residual to form the quantizer input signal *(Amendment, Page 21)*. The disclosure of Watts makes no mention of noise feedback coding and, as noted above, also fails to teach the determination of a quantization error vector in the selection of a preferred VQ codevector. Thus, Watts fails to teach vector quantization in an NFC system, as is required by the presently claimed invention.

Therefore, for at least the above reasons, Watts fails to teach the invention recited in claims 1 and 29.

Claims 2-19 and 30-47 further limit allowable independent claims, and thus, are also allowable over the prior art of record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

10. **Claims 27-28** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter:

With respect to **Claim 27**, the prior art of record fails to explicitly teach or fairly suggest a method for updating a codebook with codevectors having a minimized quantization error energy that utilizes a zero input response error and multiple zero state response error vectors, wherein the zero state error vectors are generated by combining a speech codevector with a feedback signal that results from short-term filtering the zero state response error vectors.

Claim 28 further limits claim 27, which contains allowable subject matter, and therefore, also contains allowable subject matter.

Conclusion

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Gerson et al *(U.S. Patent: 5,826,224)*- teaches a means for selecting a speech vector based on prequantizer distortion.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James S. Wozniak whose telephone number is (571) 272-7632. The examiner can normally be reached on M-Th, 7:30-5:00, F, 7:30-4, Off Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Hudspeth can be reached at (571) 272-7843. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James S. Wozniak
6/27/2006

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